

Flexible control panel

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## TECHNICAL FIELD

- 5 The present invention relates primarily to a control system or the like equipment for controlling machines or industrial processes.

- 10 The invention especially relates to such control equipment that may easily be adapted to different purposes and different industrial processes.

- 15 One special field of application are control panels or control desks for electronic or electric control equipment and where the different control sections consist of modules.

## BACKGROUND OF THE INVENTION

- 20 It has proved that operators working in process plants, such as factories, electric utilities and the like, prefer to carry out their work with the aid of older types of control equipment, instrument and control panels rather than the more modern display screens.

- 25 One disadvantage of the older type of control equipment is the significantly lower flexibility. Instruments and control buttons cannot, of course, be readily replaced or moved about on the control panel, among other things because of the extensive wiring that this would require. This entails  
30 considerable drawbacks when the controlled processes are changed, updated or replaced. Currently, supervision and control are therefore carried out to an increasing extent with the aid of display screens, the interfaces of which may be readily adjusted to different purposes and needs. The  
35 contents of the display screens are, of course, controlled by the processes in a computer.

## OBJECT AND MOST IMPORTANT CHARACTERISTICS OF THE INVENTION

The object of the invention is to provide a device wherein said disadvantages are eliminated and which suggests a control system that is flexible and readily adaptable to successively varying industrial processes or the needs and wishes of individual operators.

The invention also relates to a system for control and monitoring equipment comprising a control panel and at least one control member.

The invention is achieved in that the control member comprises an easily movable module that may be detachably placed on the front surface of the control panel and that the module communicates wirelessly with a central unit, via which externally controlled units are influenced/controlled.

## BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The invention will be explained in greater detail in the following with reference to the accompanying drawings.

Figure 1 schematically shows a cross section through a control panel according to the invention.

Figure 2 shows, in principle, a feasible variant of the control panel from above.

Figure 3 shows another variant of an inventive control panel from above.

Figure 4 shows the control panel in Figure 3 but from the under side thereof.

Figure 5 shows individual parts of the control panel.

Figure 6 shows a cross section through the upper side of the control panel, wherein the section intersects an interaction unit.

- 5 Figure 7 shows an alternative embodiment, which is transparent to light, of the upper side of the control panel.

#### DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

- 10 To achieve sufficiently high flexibility in an installation with discrete components, instruments and control devices, it is important that the cabling be reduced to a minimum. The problems of older types of control panels were to a great extent due to the instruments and control sections  
15 being secured to the control panel which required extensive cabling, not only between the control panel and the machines being controlled but also in the actual control panel.

- According to the invention, the control panel (see Figure 1)  
20 comprises a box 2 of a suitable material such as, for example, steel, aluminium or plastic. The upper side of the box, the panel 3, may be somewhat inclined towards an operator 4 to improve his or her overview of instruments and control members. The instruments and control members, which may be  
25 voltmeters, switches, potentiometers, indicators, control lamps, etc., lack physical/galvanic external connections out from the control panel 1, but also lack physical/galvanic connections inside the box 3 itself.

- 30 Each individual function instead consists of a movable interaction unit, control member or a module 5 which communicates its data in a wireless manner, for example by means of Bluetooth technique, with a central communication unit 6a located in or adjacent to the box 6. An identity or address  
35 is allocated to each module 5, which enables individual communication with each module 5, either between the modules 5 if this should be desired, or with the central communication unit 6a.

The central communication unit 6a, in turn, communicates with the machines or processes (not shown) that are to be monitored or controlled. This communication may occur wirelessly or preferably over physical cables.

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The modules 5 may be supplied with current with the aid of batteries placed in each module 5, but more preferably via a system without batteries and wires. Such a system may be an electromagnetic transfer of electrical energy. An energy transmitter 7 in the form of a coil or the like is then placed in or adjacent to the control panel 1 and connected to a suitable external current supply. The electromagnetic field thus generated in this energy transmitter 7 is taken up by the modules 5 through suitable components, for example small coils, located therein. The electronics in the modules 5 should be of a low-energy type, since wireless transmission of energy entails limitations.

The modules 5 may constitute instruments displaying different measured values. They may be pointer instruments but also digital instruments using liquid crystals for displaying alphanumerical symbols, etc. To increase the readability of these modules, the control panel 1 may be provided with a "background light". In the simplest case, this may consist of one or more light sources 8 such as lamps placed in the box 2 and connected to an external current source. By designing the modules 5 transparent, the light may pass out through the modules 5, thus obtaining good readability of instruments and control members.

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Figure 2 schematically shows a control panel 1 from above, wherein different modules 5 are distributed on a panel 3. In this case, the panel 3 has recesses wherein the modules 5 may be easily pressed down and where they are securely positioned until they need to be moved again. Figure 3 shows a module 5 which is here provided with a pointer instrument 9, a few indicators 10 and a few pushbuttons 11. Figure 4 shows the most important components/functions of the module 5, which are directed towards the interior of the control panel

1. Here, a communication unit 6b, a receiver 12 for electrical energy and an LCD unit 13, operating with the internal background light, are located.

5 Figure 5 shows a module 5 and a few concrete examples of an electrical energy transmitter 7, an electrical energy receiver 14, a central communication unit 6a and a communication unit 6b for Bluetooth communication as well as an interface 17 to the switches, indicators and instruments of the modules 5.  
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Figure 6 shows a cross section through a panel 3, here consisting of a grid 18 of metal or plastic in which recesses, adapted for standardized modules 5, are arranged. The module  
15 5, which is provided with a flange 19, is lowered into one of the recesses and may, if desired, be screwed to the grid 18.

Figure 7, finally, shows a transparent panel 3 provided with  
20 a netting 20 of thin metal arranged on a transparent base plate 21. The modules 5 may be provided with small magnets (not shown) which secure them in the desired position on the panel 3. This gives a very flexible system which at the same time is transparent and may use background light.

25 The control panel 1 according to the invention, as well as the modules 5 designed therefor, thus result in a system that is very flexible. The modules 5, which are preferably totally enclosed, may be readily replaced or moved about  
30 such that the control panel 1 is all the time maximally adapted to the installation to be monitored or controlled. No re-connection of cables is required. Also individual needs and desires on the part of the operators 4 may be readily satisfied. This may be important in order to achieve  
35 higher efficiency and monitoring capacity. The latter is, of course, not least important, for example in critical processes such as in nuclear power plants or the like.

Although the invention has been described above by means of a few concrete embodiments, the invention is not, of course, limited to these embodiments; other embodiments and variants are feasible within the scope of protection of the claims.